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Linkosia aquatica sp. nov. from submerged plant debris from Brazil

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Abstract — A new species, *Linkosia aquatica*, found on a submerged decaying twig in a stream, is described and illustrated. It is characterized by cylindrical, slightly clavate, sometimes filiform conidia that are 8–21-septate with a distinctly subclavate pale brown apical cell. A key to all *Linkosia* species and illustrations of their conidia are provided.

Key words — hyphomycetes, freshwater, taxonomy

Introduction

Linkosia A. Hern-Gut. & B. Sutton, typified by *L. coccothrinacis* (A. Hern-Gut. & J. Mena) A. Hern-Gut. & B. Sutton, is distinguished by conidiophores reduced to a monoblastic, lageniform, subulate to subcylindrical, determinate conidiogenous cell and solitary, obclavate to cylindrical or clavate, sometimes rostrate, distoseptate, pale brown or brown conidia (Hernández-Gutiérrez & Sutton 1997). Since the genus was established, ten additional *Linkosia* species have been either described as new or transferred from *Sporidesmium* and *Janetia* (Almeida et al. 2014, Castañeda-Ruiz et al. 2000, Delgado 2014, Ma et al. 2011, Wu & Zhuang 2005, Zhang et al. 2009).

During research on hyphomycetes occurring on submerged decaying plant debris, a unique specimen of *Linkosia* was found, which is described here as new. A key to the eleven accepted *Linkosia* species is presented, based on their conidial morphology.

Materials & methods

Samples of submerged plant materials in freshwater from Serra da Fumaça, Bahia, Brazil, were placed in plastic bags. The materials were washed in tap water and placed on moist filter paper in glass Petri dishes (100 mm diam.). The dishes were then placed in coolers (150 L capacity), filled with 200 mL sterile water and 2 mL glycerol, and incubated at room temperature (Castañeda-Ruiz et al. 2016). The plant material was examined at regular intervals over a month of incubation for the presence of microfungi. Mounts were prepared in PVL (polyvinyl alcohol and lactic acid) and measurements were taken at ×1000. Microphotographs were made using a BX51 Olympus microscope equipped with bright field and Nomarski interference optics and a DP25 Olympus digital camera. The specimens were deposited in the Herbarium of Universidade Estadual de Feira de Santana, Bahia, Brazil (HUEFS).

Taxonomy

Linkosia aquatica L.B. Conc., M.F.O. Marques & R.F. Castañeda **sp. nov.** FIG 1

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Differs from *Linkosia multisepta* by its cylindrical, slightly clavate, sometimes filiform, mostly 8–21-septate, straight conidia.

TYPE: Brazil, Bahia State: Pindobaçu, Serra da Fumaça, Riancho das Neves, 10°74′S 40°36′W, on submerged decaying twig of an unidentified plant in a stream, 7.XII.2014; coll. L.B. Conceição (**Holotype**: HUEFS 216022).

ETYMOLOGY: Latin, *aquatica*, refers to its growing in water.

COLONIES on the natural substrate effuse, hairy, brown. Mycelium mostly superficial. Hyphae slightly branched, smooth, pale brown to black, 2–4 µm wide. CONIDIOPHORES absent. CONIDIOGENOUS CELLS monoblastic, determinate, lageniform, subulate to subcylindrical, dark brown or black, smooth, 12–18 × 5–6 µm. Conidial secession schizolytic. CONIDIA solitary, acrogenous, straight, cylindrical, slightly clavate, sometimes filiform, conical truncate at the basal cell, slightly inflated at the apical cell, 8–21-distoseptate, smooth, dry, versicolored with the basal cells brown to dark brown, the middle cells brown, and cells toward the apex pale brown; overall 50–240(–330) × 4–5 µm with a 4–5 µm long basal cell and 10–13 × 4–5 µm apical cell.

NOTE: *Linkosia aquatica* is superficially similar to *L. multisepta* W.P. Wu, which differs by its conidia that are obclavate to obclavate-rostrate, 27–30-distoseptate, straight or slightly curved, pale brown to brown, and 300–380 × 12–14 µm (Wu & Zhuang 2005, as "*multiseptum*").

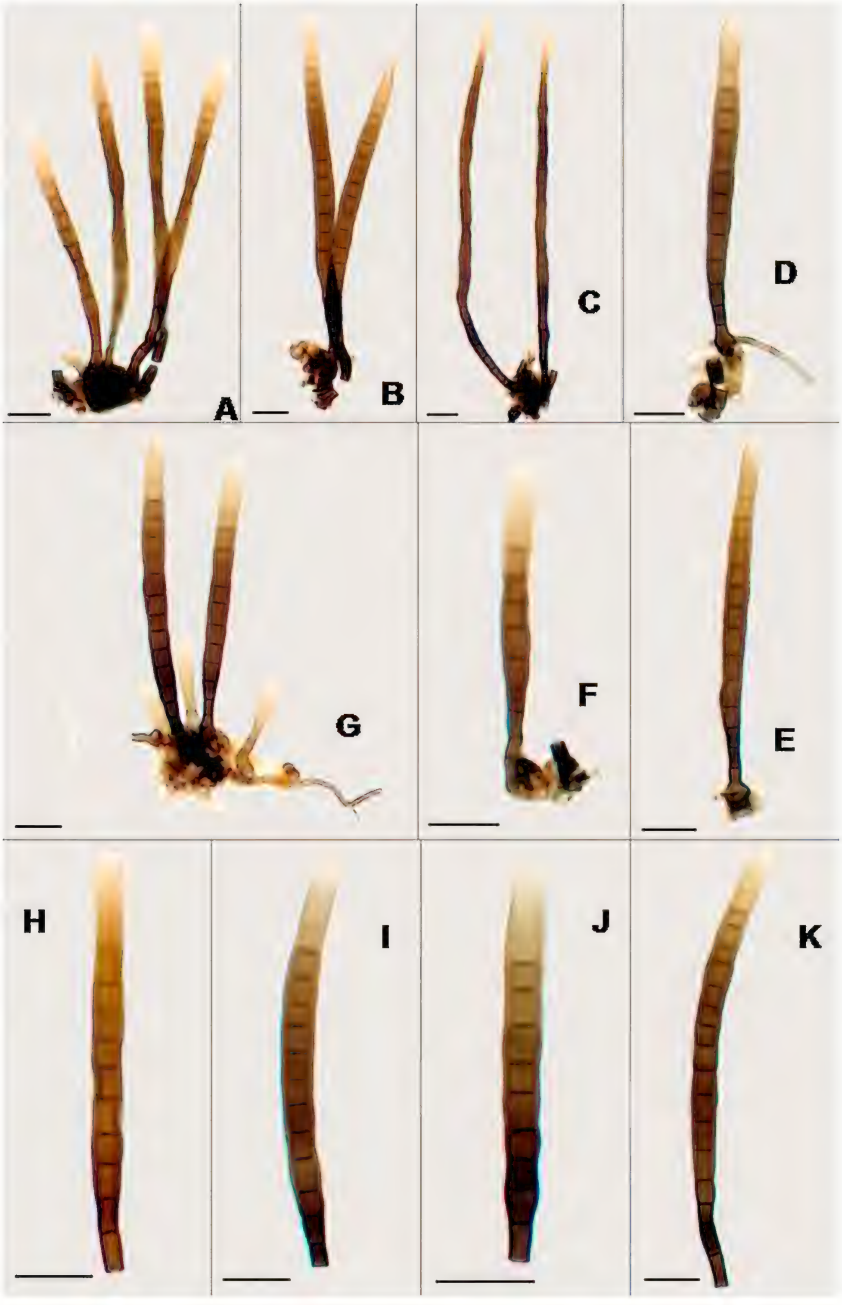

Fig. 1. *Linkosia aquatica* (holotype, HUEFS 216022): A–G. conidiogenous cells and conidia; H–K. conidia. Scale bars = 10 µm.

Key to *Linkosia* species (Figs. 1–4)

1. Conidia with an apical appendage, navicular, 5–6-distoseptate,
28–42 × 9–13 µm (appendage excluded),
appendage 5–12 µm long .... *L. ponapensis*
1. Conidia without apical appendage 2

2. Conidia rostrate 3
2. Conidia not rostrate 9

3. Conidia 4–7-distoseptate, narrowly obclavate to obclavate rostrate,
43–71.5 × 7–11 µm .... *L. coccothrinacis*
3. Conidia not as above 4

4. Conidia <18-septate 5
4. Conidia sometimes >18-distoseptate 6

5. Conidia 12–14-distoseptate, obclavate to obclavate-rostrate,
110–125 × 9–12 µm .... *L. obclavata*
5. Conidia 9–18-distoseptate, narrowly obclavate to long obclavate rostrate,
(73–)91–158(–172) × 6.5–12 µm .... *L. longirostrata*

6. Conidia sometimes >20-distoseptate 7
6. Conidia 15–20-distoseptate, obclavate to obclavate-rostrate,
100–160 × 13–15 µm .... *L. fusiformis*

7. Conidia <25-distoseptate 8
7. Conidia 27–30-distoseptate, obclavate to obclavate-rostrate,
300–380 × 12–14 µm .... *L. multisepta*

8 Conidia 15–21-distoseptate, obclavate to obclavate-rostrate,
122–177 × 12–16 µm .... *L. mori*
8. Conidia 16–21-distoseptate, obclavate to obclavate-rostrate,
160–210 × 7.5–9.5 µm .... *L. hibisci*

9. Conidia smooth 10
9. Conidia verruculose 11

10. Conidia bacilliform, attenuated at the ends, 5–9-distoseptate,
60–156 × 5–8 µm .... *L. bacilliformis*
10. Conidia cylindrical, slightly clavate, sometimes filiform, 16–21-distoseptate,
50–240(–330) × 4–5 µm .... *L. aquatica*

11. Conidia pyriform or obpyriform to cylindrical 1–7-distoseptate,
16–57 × 5.5–9 µm .... *L. canescens*
11. Conidia pyriform or obpyriform, 4–6-distoseptate, 31–37 × 7–8 µm .... *L. refugia*

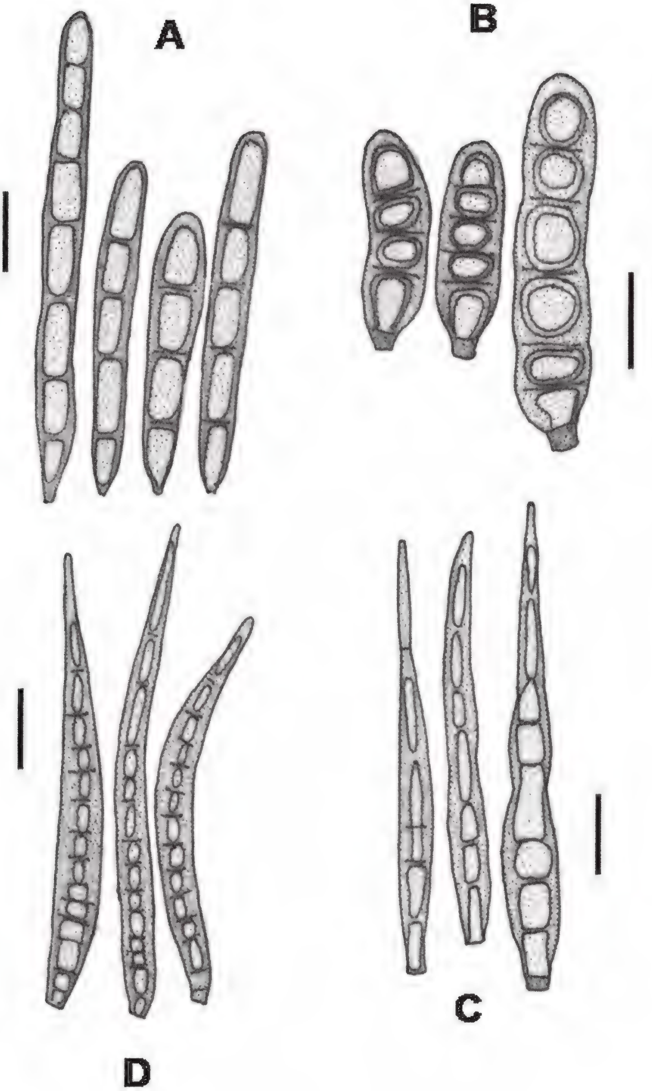

Fig. 2. Conidia of *Linkosia* spp.:
A. *L. bacilliformis* (Gamundi et al. 1979); B. *L. canescens* (Sutton & Pascoe 1988);
C. *L. coccothrinacis* (Hernández-Gutiérrez & Sutton 1997); D. *L. fusiformis* (Wu & Zhuang 2005).
Scale bars = 10 µm.

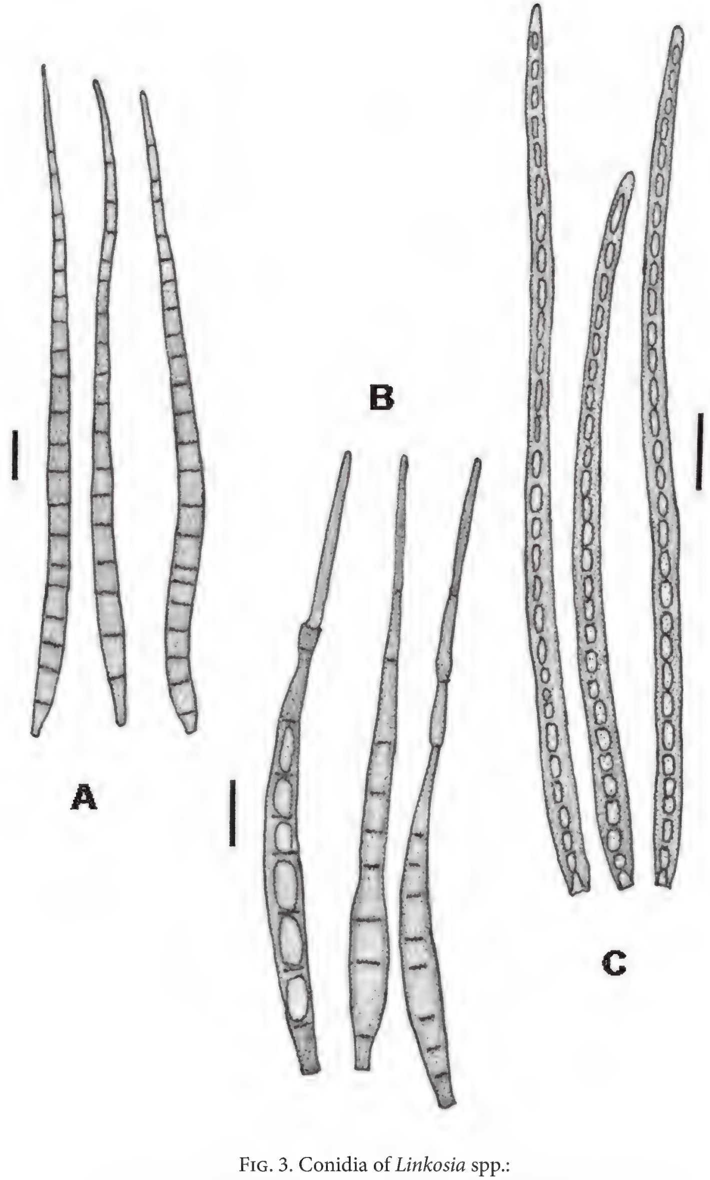

Fig. 3. Conidia of *Linkosia* spp.:
A. *L. hibisci* (Ma et al. 2011); B. *L. longirostrata* (Delgado 2014);
C. *L. multisepta* (Wu & Zhuang 2005).
Scale bars = 10 µm.

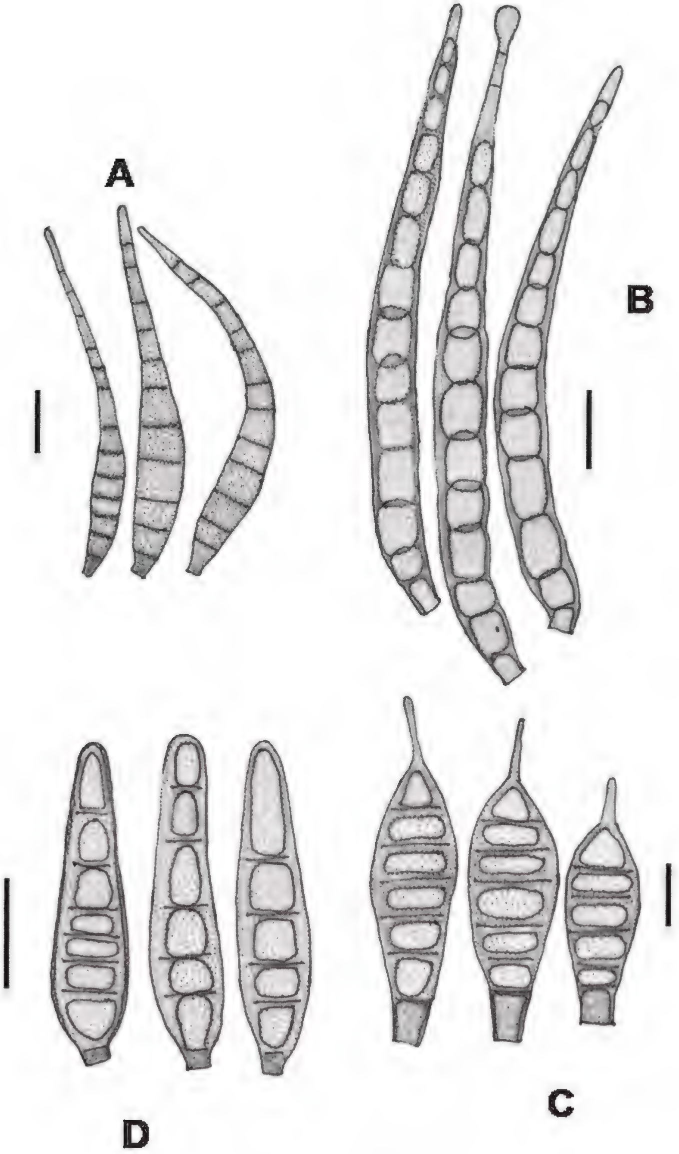

Fig. 4. Conidia of *Linkosia* spp.:
A. *L. mori* (Zhang et al. 2009); B. *L. obclavata* (Wu & Zhuang 2005);
C. *L. ponapensis* (Matsushima 1981); D. *L. refugia* (Sutton & Pascoe 1988).
Scale bars = 10 µm.

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